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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/649,016 | 08/25/2003 | Matthew Lee McCullough | M023-1001 | 9553 |
| 7590 | 03/29/2006 | | EXAMINER | |
| William G. Lane P.C. 16481 Laguna Canyon Road #250 Irvine, CA 92618 | | | | COOKE, COLLEEN P |
| | | ART UNIT | | PAPER NUMBER |
| | | 1754 | | |

DATE MAILED: 03/29/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | |
|------------------------------|------------------------|-------------------------|
| Office Action Summary | Application No. | Applicant(s) |
| | 10/649,016 | MCCULLOUGH, MATTHEW LEE |
| | Examiner | Art Unit |
| | Colleen P. Cooke | 1754 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 26 January 2004.

2a) This action is **FINAL**. 2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 1-56 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) Claim(s) _____ is/are allowed.

6) Claim(s) 1-56 is/are rejected.

7) Claim(s) 3-5,10,11,21,25,26,31-33,38,39,49,53 and 54 is/are objected to.

8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) Notice of References Cited (PTO-892)
 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
 Paper No(s)/Mail Date 1/26/04.

4) Interview Summary (PTO-413)
 Paper No(s)/Mail Date. _____.
 5) Notice of Informal Patent Application (PTO-152)
 6) Other: _____.

Claim Objections

Claims 3-5, 10, 11, 21, 25, 26, 31-33, 38, 39, 49, 53, and 54 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

With respect to claims 3, 4, 31, and 32, the parent independent claims each already require a *catalytic oxidizer*.

With respect to claims 5, 11, 21, 26, 33, 39, 49, and 54, the parent independent claims each already require exhausting the regeneration *air stream* into the *atmosphere*.

With respect to claims 6, 22, 34, and 50, the parent independent claims already require regenerating the adsorbent at *above-atmospheric* pressure.

With respect to claims 10, 25, 38, and 53, the parent independent claims already require that removing the adsorbent from the adsorbent bed to a regeneration column and placing the later-regenerated adsorbent back into the adsorption bed. Because these steps are already required by the independent claims and would not be possible or necessary were the adsorbent bed and regeneration bed or column the same device the claims fail to further limit the parent claims.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-56 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Independent claims 1, 14, 29, and 42 each refer to regeneration of the adsorbent at elevated temperature and above-atmospheric pressure. However, the specification (see [0081]) discloses that the regeneration column is at atmospheric pressure (however it may also be under a vacuum). No mention is made to above-atmospheric pressure, which is believed to be more of a typographical error in the claims and will therefore be treated as requiring atmospheric pressure as stated in the specification.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 9-10, 16-20, 37-38, and 45-48 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 17-20 and 45-48 are indefinite because although the claims each appear to add several steps to the process of the parent claim, it is unclear as to when/where these additional steps are meant to be added. For example, with respect to steps a-i of Claim 14, when or where do the additional steps in claim 17 of reintroducing oxygen, destroying HAP vapors, and scrubbing each occur?

Claims 9 and 37 each recite the limitation "the desorbed HAP vapors" in line 1. There is insufficient antecedent basis for this limitation in the claim.

Claims 10 and 38 each recite the limitation "the adsorption bed and regeneration bed" in line 1. There is insufficient antecedent basis for this limitation in the claim.

Claims 16 and 44 each recite the limitation "the regeneration gas" in line 1. There is insufficient antecedent basis for this limitation in the claim.

Claims 21 and 48 each recite the limitation "the scrubbed vapors" in line 1. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-5, 7, 9-21, 23, 25-33, 35, 37-49, 51, and 53-56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cioffi et al. (5676738) in view of any one of Mason (2004/0024279), Michalakos et al. (6503462), Michalakos et al. (20020193064), or Stilger et al. (5601790).

Cioffi et al. teaches a process for VOC control and recovery. Cioffi et al. teaches that a contaminated air stream is passed through a bed of synthetic adsorbent (Column 2, lines 32-55), spent adsorbent is removed for regeneration (Column 3, lines 19-36), regenerating at elevated

temperature which may be achieved by a microwave heat source and in the presence of a carrier gas such as inert gas and wherein the oxygen content is controlled (Columns 3-4, lines 34-15 respectively), cooling the adsorbent (Column 4, lines 18-20), replacing the regenerated adsorbent back into the adsorption bed (Column 4, lines 21-33) and contacting the desorbate stream containing the vapors stripped from the adsorbent with an oxidizer (Column 4, lines 40-52; Column 6, lines 22-33) before being released to the atmosphere. Cioffi et al. also teaches that the desorbate stream, after oxidizing, can be passed through a liquid-cooled heat exchanger and then used directly (Column 6, lines 34-46). Cioffi et al. further teaches that VOCs can be destroyed by UV light (Column 5, lines 20-25). Although Cioffi et al. teaches that the vapors are destroyed in an oxidizer, Cioffi et al. is silent as to the specific type of oxidizer used and is also silent as to any additional steps for removal of acid gas.

Mason teaches (see [0050], [0052], [0053]) that VOCs are oxidized in reactor (12) which includes metal catalysts and therefore meets the claim limitation of destruction of vapors using a catalytic oxidizer. Mason also further teaches that after this step it may be desirable to neutralize residual remaining acid gases in the gas stream in a downstream caustic scrubbing step (see [0055]).

Michalakos et al. (6503462) teaches that VOCs may be oxidized over a catalyst (Column 3, lines 11-25) and that by-product acid gases are then removed by an adsorbent (Column 3, lines 26-28).

Michalakos et al. (20020193064) teaches that VOCs may be oxidized over a catalyst and that by-product acid gases are then removed by an adsorbent (see [0016]).

Stilger et al. teaches a method for the destruction of VOCs wherein the VOCs are destroyed in an oxidizer such as a thermal or catalytic oxidizer (Column 4, lines 1-9) at a time and temperature sufficient to achieve the desired result (Column 4, lines 14-17) and that the gas stream is then preferably passed through an acid gas scrubber (Column 4, lines 29-33) before being released to the atmosphere.

It would have been obvious to modify the method of removing VOCs which includes oxidizing the gas stream and releasing it to the atmosphere as taught by Cioffi et al. by *catalytically* oxidizing the gas stream *and* treating it to remove acid gas prior to release into the atmosphere because each one of Mason (2004/0024279), Michalakos et al. (6503462), Michalakos et al. (20020193064), and Stilger et al. (5601790) teach that VOCs are can be removed/destroyed by passing the gas stream through a catalytic oxidizer and that after this it is desirable to remove acid gas from the stream before releasing it to the atmosphere. Thus it would be obvious to catalytically oxidize as Cioffi et al. is silent as to any specific type of oxidizing and is therefore open to any oxidizing known in the art for the treatment of VOCs and it is also obvious to further include a step of removing acid gases as the prior art teaches that such additional step is desirable after catalytic oxidizing.

With respect to claims 2, 15, 30, and 43, Cioffi et al. teaches that the adsorbent may be Ambersorb 563 which is hydrophobic.

With respect to claims 5, 9, 21, 33, 37, and 49, Cioffi et al. teaches that the exhaust stream may be used directly in the adsorber (Column 4, lines 53-55) or, with respect to claims 7,

23, 35, and 51, that the final exhaust stream may also be used to provide heat (Column 4, lines 44-45 and 66-67) therefore achieving heat recovery.

Claims 6, 22, 34, and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cioffi et al. (5676738) in view of any one of Mason (2004/0024279), Michalakos et al. (6503462), Michalakos et al. (20020193064), or Stilger et al. (5601790) as applied to claims 1, 14, 29, and 42 above, and further in view of either one of Kotagiri et al. (6478854) or Atkins et al. (4256712).

Cioffi et al. in view of any one of Mason, Michalakos et al. (6503462), Michalakos et al. (20020193064), or Stilger et al. teach the process as described with respect to claims 1, 14, 29, and 42 above. Cioffi et al. does not teach that the regeneration is performed under a vacuum.

Kotagiri et al. teaches that a reduced pressure, achieved via vacuum, is desirable in the regeneration of adsorbent since it facilitates desorption (Column 13, lines 12-18). Thus, it would be obvious to perform the regeneration as taught by Cioffi et al. under vacuum conditions because vacuum conditions facilitate desorption of the sorbent, as taught by Kotagiri et al.

Atkins et al. teaches that when using a vacuum during sorbent regeneration, a lower regeneration temperature is required (Column 4, lines 43-47). This it would be further obvious to perform the regeneration as taught by Cioffi et al. under vacuum conditions because the vacuum conditions reduce the temperature required to perform regeneration as taught by Atkins et al., desirably resulting in significant savings in energy use.

Claims 8, 24, 36, and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cioffi et al. (5676738) in view of any one of Mason (2004/0024279), Michalakos et al. (6503462), Michalakos et al. (20020193064), or Stilger et al. (5601790) as applied to claims 1, 14, 29, and 42 above, and further in view of either one of D'Souza (5453259) or Rose et al. (5435141).

Cioffi et al. in view of any one of Mason, Michalakos et al. (6503462), Michalakos et al. (20020193064), or Stilger et al. teach the process as described with respect to claims 1, 14, 29, and 42 above. Cioffi et al. does not teach that the initial contaminated gas stream is cooled prior to passing it through the adsorbent.

D'Souza teaches that sorbents are most effective at adsorbing VOCs when cool. Thus it would be obvious to cool the VOC-containing gas stream of Cioffi et al. prior to contact with the adsorbent to increase the effectiveness of this step.

Rose et al. teaches that cooling causes VOCs to precipitate from a gas stream. Thus it would have been obvious to cool the VOC-containing gas stream of Cioffi et al. prior to contact with the adsorbent to aid in the removal of the VOCs since as Rose et al. teaches the cooling cause the VOCs to precipitate out of the gas stream, facilitating removal.

Conclusion

The prior art made of record and not relied upon (see attached Notice of References Cited) is considered pertinent to applicant's disclosure, particularly with respect to certain limitations that failed to further limit the claims as currently written.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Colleen P. Cooke whose telephone number is 571-272-1170. She can normally be reached Mon.-Fri. 9:00 am - 6:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, her supervisor, Stan Silverman can be reached at 571-272-1358. The official fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Colleen P. Cooke
Primary Examiner
Art Unit 1754